Toxic-Impaired Waterbodies in the Columbia River Basin

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Note:

The following document is under-development and is a draft. Do not distribute. The following work efforts to be completed prior to finalizing and publishing the document:

1. Format Cover Page
2. Update Executive Summary and write introduction to Overview of Impaired Waters section
3. Update maps and related text for Aldrin/Dieldrin, DDT, lead, and PCBs to specify that the Columbia Slough TMDL is not included on OR's 2018/2020 Integrated Report data.
4. Update Table of Contents; insert Figure List
5. Manually reformat references/citations to use "(2019a)" format, use organization acronyms where appropriate.
6. Format document layout (e.g. ensure tables don't run across pages)
7. Final review by EPA staff (Mary Lou / Michelle Wilcox)
8. Incorporate any edits as needed

Proposed Timeline

The plan is to incorporate all updates to the document by Friday, March 13th. Final review and edits to be completed a week later, by Friday, March 20th.

Final document to be posted on EPA's Columbia River website by Friday, March 27th.

Acknowledgements

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Executive Summary

Toxic contaminants are naturally occurring or manufactured chemicals that can be harmful to aquatic life, wildlife, and people. Many toxic contaminants break down slowly and can accumulate in the environment and concentrate in plants, wildlife, and people. For the purposes of this document, toxic contaminants are defined as metals, pesticides and their breakdown products, and/or organic or inorganic compounds that are known to negatively affect the health of aquatic life, wildlife, or humans.

Under the Clean Water Act (CWA), states are required to assess their waters bi-annually, identify waterbodies that fail to meet their designated uses due to impaired water quality conditions, and develop Total Maximum Daily Loads (TMDL) for their impaired waters. Recognizing how difficult it was to develop TMDLs and implementation plans to address toxics, in 2005 the Environmental Protection Agency (EPA) established the Columbia River Toxics Reduction Working Group (Working Group), a voluntary collaboration tribal, state, and local governments; federal agencies; industry; soil and water conservation districts; and nonprofit organizations. The purpose of the Working Group is share information, coordinate activities, and develop strategies to address toxics in the Columbia River basin. In 2016, Congress amended the CWA, creating Section 123, the Columbia River Basin Restoration Act. Columbia River Toxics Reduction Working Group modeled after the existing Working Group and provided a framework for future funding of toxic reduction, monitoring, and outreach actions through a competitive grant program. In 2019, Congress allocated $1 million to EPA to implement the program. Waterbodies listed as impaired for toxic pollutants can serve as a starting point for prioritizing restoration and management actions and the presence or absence of waterbodies on 303(d) lists can help identify data gaps to inform future monitoring and assessment efforts.

This document is intended for use by the Columbia River Basin Restoration Act Working Group and other entities working to understand and reduce toxics in the Columbia River Basin (the Basin). The document 1) identifies all toxic contaminants that are listed on 303(d) lists of impaired waters in the Columbia River Basin, 2) summarizes the location of toxics-impaired waters for ten contaminants regulated under the Clean Water Act, and 3) provides links to EPA-approved TMDLs that calculate pollution budgets for toxic pollutants.

Data from Integrated Reports submitted by the States of Idaho, Montana, Oregon and Washington were used to identify all toxic pollutants that are classified as category 4a, impaired with an EPA-approved TMDL, or category 5, impaired or threatened waters in which a designated use is not being met and a TMDL is needed, in the Columbia River Basin portion of one or more states. Additionally, the document provides summary information on ten metals and inorganic compounds, pesticides, and persistent organic pollutants, including the watersheds that contain one or more impaired waterbody. The ten contaminants are: arsenic, copper, lead, mercury, selenium, aldrin/dieldrin, chlorpyrifos, DDT and its degradants, PAHs, and PCBs. Information on EPA-approved TMDLs for toxic pollutants is also provided, including links to the source documents which provide details on the location and extent of impaired waters and a description of the required reductions for each parameter.

Purpose

This document is intended for use by Columbia River Basin Restoration Act Working Group members and other interested entities working to better understand and reduce toxics in the Basin. The document 1) identifies all toxic contaminants that are listed on 303(d) lists of impaired waters in Columbia River Basin, 2) summarizes the location of category 5 toxics-impaired waters and Total Maximum Daily Loads (TMDLs) for ten contaminants regulated under the Clean Water Act, and 3) provides links to the EPA-approved TMDLs that calculate pollution budgets for toxic pollutants.

Background

Toxic contaminants are naturally occurring or manufactured chemicals that can be harmful to fish, wildlife, and people. Many toxic contaminants break down slowly and can accumulate in the environment and concentrate in plants, wildlife, and people through bioaccumulation/magnification[1]. For the purposes of this document, toxic contaminants are defined as metals, pesticides and their breakdown products, and/or organic or inorganic compounds that are known to negatively affect the health of fish, wildlife, and human health. Conventional water quality pollutants, such as temperature, total nitrogen/phosphorus, and bacteria, among others, are not considered toxic contaminants and are excluded from the analysis.

In the early 1990s, the EPA published the National Study on Chemical Residues in Fish which found toxic contaminants were present in fish tissues in the Basin at elevated levels that could negatively impact aquatic life and human health. In 1994, the Columbia River Inter-Tribal Fish Commission published a fish consumption survey of its member tribes that found, on average, adult tribal members consumed 58.7 grams of fish per day – 9 times the fish consumption rate of 6.5 grams per day used by EPA to establish water quality criteria at the time. Although many data gaps remain, monitoring and assessment of toxic contamination in the Columbia River Basin has increased over the last several decades. EPA published a reference document featuring peer reviewed science and federal, state, and tribal government reports and publications related to toxic pollutants in the aquatic environment on its [HYPERLINK "https://www.epa.gov/columbiariver/columbia-river-basin-toxic-contaminants-reference-list"].

In 2005, EPA established the Columbia River Toxics Reduction Working Group (the Working Group), a voluntary collaboration between tribal, state, and local governments; federal agencies; industry; soil and water conservation districts; and nonprofit organizations. The Working Group was created to share information, coordinate activities, and develop actions to assess and reduce toxics in the Basin. There was a recognition that this work was needed due to the difficulty in developing TMDLs and implementation plans for toxic pollutants, many of which had unknown sources. In addition to other reports, the Working Group summarized available information on four priority chemicals in the [HYPERLINK "https://www.epa.gov/columbiariver/2009-state-river-report-toxics"] and identified 61 actions to reduce toxic pollutants the [HYPERLINK "https://www.epa.gov/columbiariver/columbia-river-basin-toxics-reduction-action-plan"].

In 2016, Congress amended the Clean Water Act by adding Section 123 which required EPA to establish the Columbia River Basin Restoration Program. It was the first legislation to officially designate the

[1] Bioaccumulation refers to the accumulation of a toxic chemical in the tissue of a particular organism; biomagnification refers to the increased concentration of a toxic chemical the higher an animal is on the food chain.

national importance of restoring the Basin. Clean Water Act Section 123 directed EPA to establish the Columbia River Toxics Reduction Working Group[2] modeled after the existing Working Group and provided a framework for future funding of toxic reduction, monitoring, and outreach actions. In fiscal year 2019, Congress appropriated $1 million to EPA to implement the program.

There are over 86,000 chemicals registered for use in commerce in the United States (U.S. EPA, 2019). However, only a small number are regulated under the Clean Water Act (CWA), the primary law regulating pollution of the nation's waterways. While not comprehensive, two lists, the Toxic Pollutant List and the Priority Pollutant List, were developed in the mid-1970's to help states and EPA address toxics chemicals through effluent limits, permits, and water quality criteria (either numeric or narrative). The Toxic Pollutant List specifies 65 pollutants or groups of pollutants and is referenced by the CWA at Section 307(a)(1). The [HYPERLINK "https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf"] builds off the Toxic Pollutant List by specifying 126 specific pollutants that were produced in significant quantities, found in the nation's waterways at a frequency occurrence of at least 2.5 percent, and had published analytical test methods (U.S. EPA, 2019).

Every two years, the CWA requires states to assess the quality of their waters and submit a report to the EPA on the condition of their surface waterbodies. The statewide assessment information is referred to as the CWA Section 305(b) list. Waterbodies are classified into one of five categories ranging from category 1 (meets standards) to category 5 (polluted waters that require a pollution control measure). Waterbodies that fail to meet numeric and/or narrative water quality criteria established to achieve their designated use(s) are considered "impaired" under the CWA. A state's impaired waterbodies are cataloged in a list, referred to as the [CWA Section] "303(d) list." This report focuses on two categories of toxic-impaired waterbodies: category 4a, waters that have an EPA-approved TMDL that sets out a pollution budget and assigns allocations for point and nonpoint sources of pollution, and category 5, waters that require a water quality improvement project. Under the CWA, states are required to establish TMDLs for the pollutant(s) that cause the category 5 impairments.

This document provides information on the location and extent of toxics-impaired waterbodies which may be helpful for prioritizing monitoring and reduction actions. In addition to identifying all toxic contaminants on 303(d) lists and the TMDLs that have been developed for toxics in the Basin, the report summarizes the extent of waterbodies impaired by ten metals and inorganic compounds, pesticides, and persistent organic pollutants:

Metals/Inorganics:	Pesticides	Persistent Organic Pollutants
1. Arsenic	6. Aldrin/Dieldrin	9. PAHs
2. Copper	7. Chlorpyrifos	10. PCBs
3. Lead	8. DDT (and breakdown products)	
4. Mercury		
5. Selenium		

[2] Now referred to as the Columbia River Basin Restoration Program Working Group

Data Sources & Methods

The States of Idaho, Montana, Oregon, and Washington publish Integrated Reports that contain their 305(b) and 303(d) lists, including the geographic data specifying the location and extent of the river/lake reaches and the cause(s) of impairment, among other information. The data used to create the tables, maps, and description of the location of impaired waterbodies were downloaded directly from each state's database ([REF _Ref29390506 \h]). For Idaho, Montana, and Washington, the document uses the most recent EPA-approved Integrated Report data. For Oregon, the memo relies on the draft 2018/2020 Integrated Report, which is provisional and subject to change. As of March 2020, EPA had not approved the new Integrated Report for CWA purposes.

Table [SEQ Table * ARABIC]. Data sources.

State	Assessment Cycle	Document Status	Date of EPA Approval	Data Source
Idaho	2016	Final	June 2019	[HYPERLINK "https://opengisdata-idahodeq.opendata.arcgis.com/datasets/idaho-deq-2016-final-%C2%A7305b-%C2%A7303d-integrated-report-rivers-streams-lakes-reservoirs"]
Montana	2018	Final	February 2019	[HYPERLINK "https://svc.mt.gov/deq/dst/" \l "/app/cwaic"]
Oregon	2018/2020	Draft*	N/A	[HYPERLINK "https://www.oregon.gov/deq/wq/Pages/2018-Integrated-Report.aspx"]
Washington	2012	Final	July 2016	[HYPERLINK "http://geo.wa.gov/datasets/waecy::waecy-water-quality-assessment-305b-report-current"]

* The draft Integrated Report was released in September 2019. The information in the draft report is subject to change and must be approved by EPA prior to taking effect. For CWA purposes, Oregon's current 305(b) and 303(d) list is the [HYPERLINK "https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp"], which EPA approved in December 2018.

Overview of Impaired Waters

Over 50 toxic pollutant have been identified as causing category 5 impairments to surface waterbodies in the Basin. Category 5 impairments for one or more toxic pollutants occur in all four basin states and are widely distributed in the watershed.

Table [SEQ Table * ARABIC]. Toxic pollutants that are known to cause category 5 impairments in the Columbia River Basin.

Toxic Contaminant	State(s)
2,3,7,8-TCDD (Dioxin)	Washington
2,3,7,8-TCDD TEQ	Washington
4,4'-DDD	Oregon, Washington

4,4'-DDE	Oregon, Washington
4,4'-DDT	Oregon, Washington
Aldrin/Dieldrin	Oregon, Washington
Alpha-BHC	Washington
Antimony	Idaho
Arsenic	Idaho, Montana, Oregon
Benz(a)anthracene [PAH]	Oregon
Benzo(a)pyrene [PAH]	Oregon
Benzo(b)fluoranthene 3,4 [PAH]	Oregon
Benzo(k)fluoranthene [PAH]	Oregon
Cadmium	Idaho
Chlordane	Oregon, Washington
Chlorine	Washington
Chlorpyrifos	Idaho, Oregon, Washington
Chromium VI	Oregon
Chrysene	Oregon
Copper	Idaho, Oregon, Washington
Cyanide	Oregon
Diazinon	Oregon
Endosulfan	Oregon, Washington
Endosulfan Sulfate	Oregon
Endrin Aldehyde	Oregon
Ethylbenzene	Oregon
Ethylhexyl Phthalate bis 2	Oregon
Guthion	Oregon
Heptachlor	Oregon
Heptachlor Epoxide	Oregon
Hexachlorobenzene	Oregon
Hexachlorobenzene	Washington
Indeno(1,2,3-cd)pyrene	Oregon
Iron (total)	Oregon
Lead	Idaho, Oregon, Washington
Malathion	Idaho, Oregon
Mercury	Idaho, Montana, Washington, Oregon
Methyl Parathion	Idaho
Methylmercury	Oregon
Oil and Grease	Idaho, Montana
Parathion	Oregon
Polychlorinated Biphenyls (PCBs)	Montana, Oregon, Washington
Polycyclic Aromatic Hydrocarbons (PAHs)	Oregon
Selenium	Idaho, Montana
Silver	Oregon, Washington
Tetrachloroethylene	Oregon
Thallium	Oregon
Toxaphene	Washington
Trichloroethylene	Oregon

Zinc	Idaho, Oregon

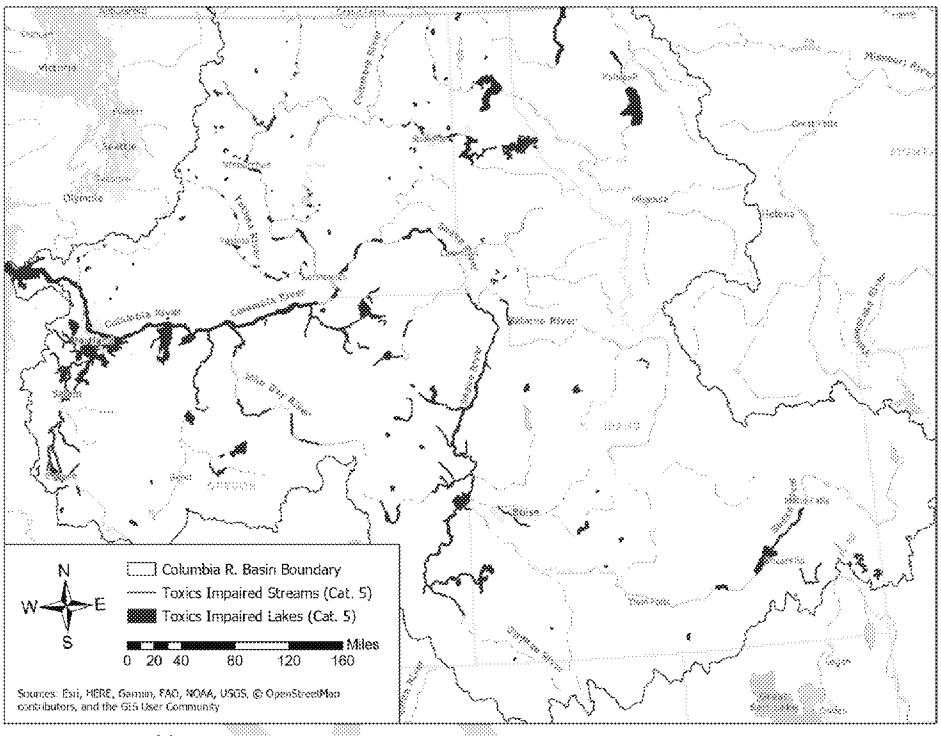

Figure [SEQ Figure * ARABIC]. Category 5 toxics-impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

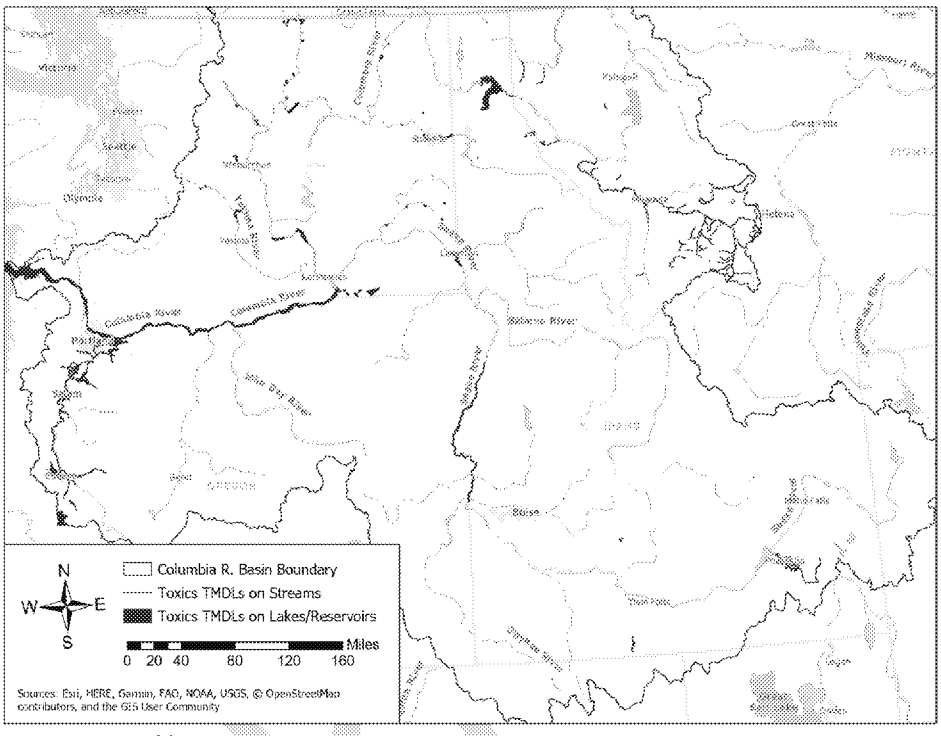

Figure [SEQ Figure * ARABIC]. EPA-approved TMDLs for toxic pollutants in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

The lack of impaired waters for a pollutant is not inherently indicative of better water quality and may be due to a lack of credible monitoring or assessment data available to the state. Further, direct comparisons between the states or between watersheds in the same state can be difficult. For example, states have different water quality standards and different methodologies for determining the size of impaired reaches. As a result, the impairments can differ markedly in total area (e.g. stream miles or acres of lakes). Therefore, a larger number of impairments may not necessarily translate into a larger overall area of impaired water. For additional information, including the location and extent of specific impaired waterbodies for each pollutant, refer to each state's respective Integrated Report data referenced in [REF _Ref29390506 \h].

The following section provides a description of ten toxic contaminants (or classes of contaminants), identifies their major sources or pathways into the environment, and details the locations of impaired waters listed under Category 4a or 5 on the mainstem Columbia and Snake Rivers and in tributary watersheds in the Basin.

Metals/Inorganics

Arsenic

Arsenic is a naturally occurring element found in the Earth's crust. Arsenic combined with oxygen, chlorine and sulfur is considered inorganic arsenic; arsenic combined with carbon and hydrogen is referred to as organic arsenic. Inorganic arsenic, long recognized as a human poison, is the form of greatest concern and has been classified as a human carcinogen by the U.S. EPA's Integrated Risk Information System (IRIS) in 1995 (U.S. EPA, 2017). Natural sources of arsenic include volcanic activity and weathering of arsenic-containing minerals and ores. Major anthropogenic sources of arsenic include metal mining and smelting, pesticides, leaching from pressure-treated lumber, combustion of coal or wood products, glass manufacturing, and waste incineration (U.S. EPA, 1998).

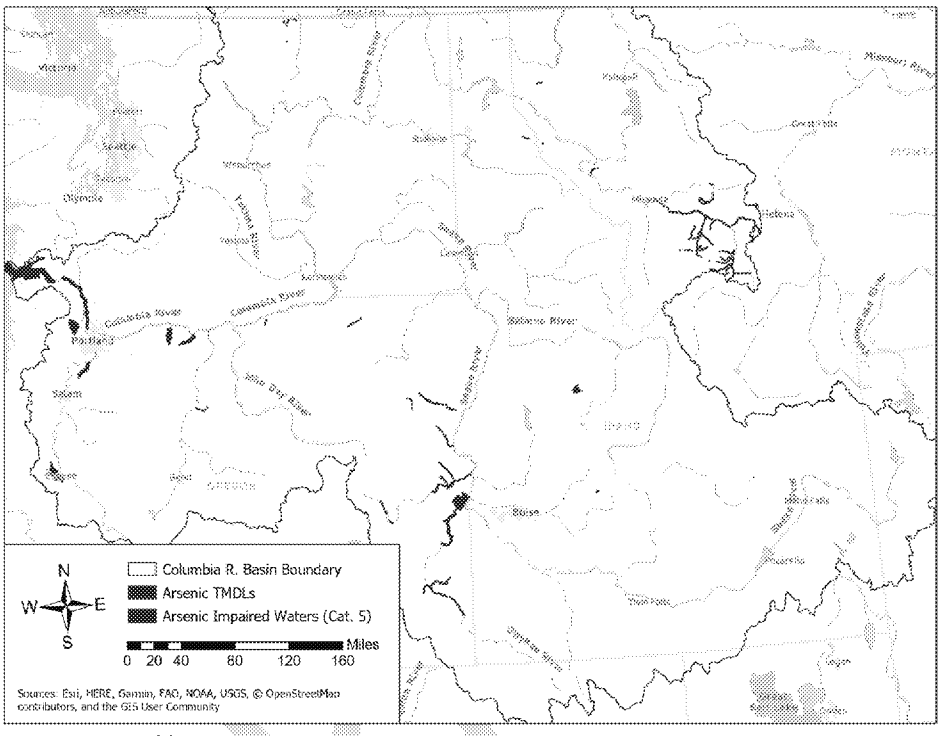

Figure [SEQ Figure * ARABIC]. Arsenic impaired waterbodies in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Inorganic arsenic impairs most of the lower Columbia River from the Willamette River confluence to the mouth of the estuary.

Oregon has the largest number of identified category 5 impairments. Arsenic impairs rivers in the Owyhee, Malheur, Power, Umatilla, Willow, Deschutes, and Willamette River basins. In Montana, multiple basins have arsenic TMDLs, and arsenic impairs a steam in the Flathead Lake watershed[3] that is not covered by a TMDL. The South Fork Salmon, Upper Coeur d'Alene, and North and Middle Forks Boise River watersheds in Idaho have at least one river reach impaired for arsenic. Although the Similkameen River watershed in Washington has an TMDL for arsenic approved by EPA in 2004, the basin includes one waterbody listed as impaired for inorganic arsenic, Connors Lake, that is not covered by the TMDL.

[3] Note: The impaired river segment is obscured by the Kalispell label on the [insert figure reference]

Table [SEQ Table * ARABIC]. Watersheds with arsenic impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	South Fork Salmon, Upper Coeur d'Alene, and North and Middle Forks Boise River watersheds	None
Montana	Flathead Lake watershed	Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Kootenai – Fisher Project, Little Blackfoot River, Middle Blackfoot – Nevada Creek, Prospect Creek
Oregon	Mainstem Columbia River; Owyhee, Malheur, Powder, Umatilla, Willow, Deschutes, and Willamette River watersheds	None
Washington	Similkameen River watershed	Similkameen River watershed

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Copper

Copper is an abundant trace metal commonly found in aquatic systems as a result of both natural and anthropogenic sources. Natural sources of copper include geological deposits, volcanic activity, and weathering and erosion of rocks and soils. Anthropogenic sources of copper include mining activities, agriculture, automobile brake-pad wear, metal and electrical manufacturing, sludge from publicly-owned treatment works, and pesticide use (U.S. EPA, 2019). Copper is primarily a contaminant of concern due to its ecotoxicity, as compared to its human health impacts.

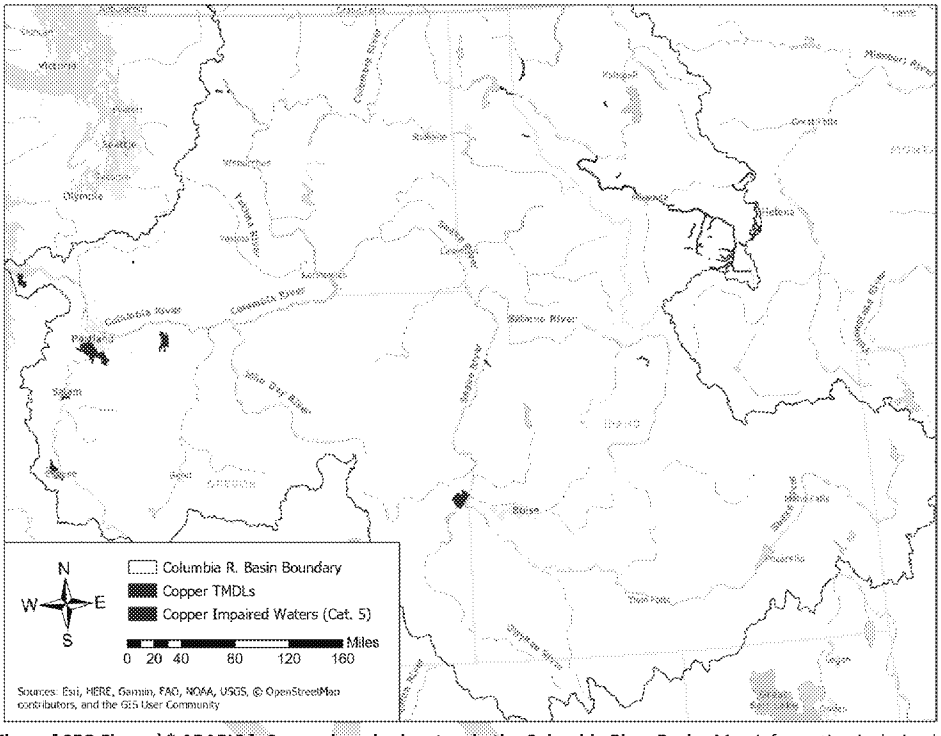

Figure [SEQ Figure * ARABIC]. Copper impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Multiple basins in Montana have a copper TMDL; there are no category 5 copper impaired waters in the state without an approved TMDL. In Idaho, copper impairs rivers in the Hells Canyon, the Middle Salmon-Panther, and Coeur d'Alene River basins. The Lower Clark Fork River has a copper TMDL. In Washington State, copper impairs streams in the Lake Chelan and Lower Cowlitz River watersheds. Oregon has identified the largest number and greatest extent of copper-impaired waters without a TMDL: the Owyhee, Willamette, Hood River, and Lower Columbia River watersheds contain copper impaired waters.

Table [SEQ Table * ARABIC]. Watersheds with copper impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Hells Canyon, Middle Salmon-Panther, and Coeur d'Alene River watersheds	Lower Clark Fork River watershed
Montana	None	Blackfoot Headwaters, Clark Fork – Drummond, Silver Bow Creek –

		Clark Fork River, Flint Creek watershed, Kootenai – Fisher, Little Blackfoot River, Thompson Project, Blackfoot River – Nevada, Ninemile, Rock Creek, and Upper Clark Fork River
Oregon	Owyhee, Willamette, Hood River, and Lower Columbia River watersheds	None
Washington	Lake Chelan and Lower Cowlitz River watersheds	None

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Lead

Although the element occurs naturally in the Earth's crust, human activities are the primary source of lead in the aquatic environment. Industrial processes and mining activities may release significant quantities of lead into the environment (U.S. EPA, 2019). In the past, the combustion of leaded-gasoline was a major pathway into the air and aquatic environments. A gradual phase-out of leaded gasoline was implemented between 1975 and 1996. Due to EPA regulations, the national average lead concentration in ambient air deceased by 99% between 1980 and 2018 (U.S. EPA, 2019).

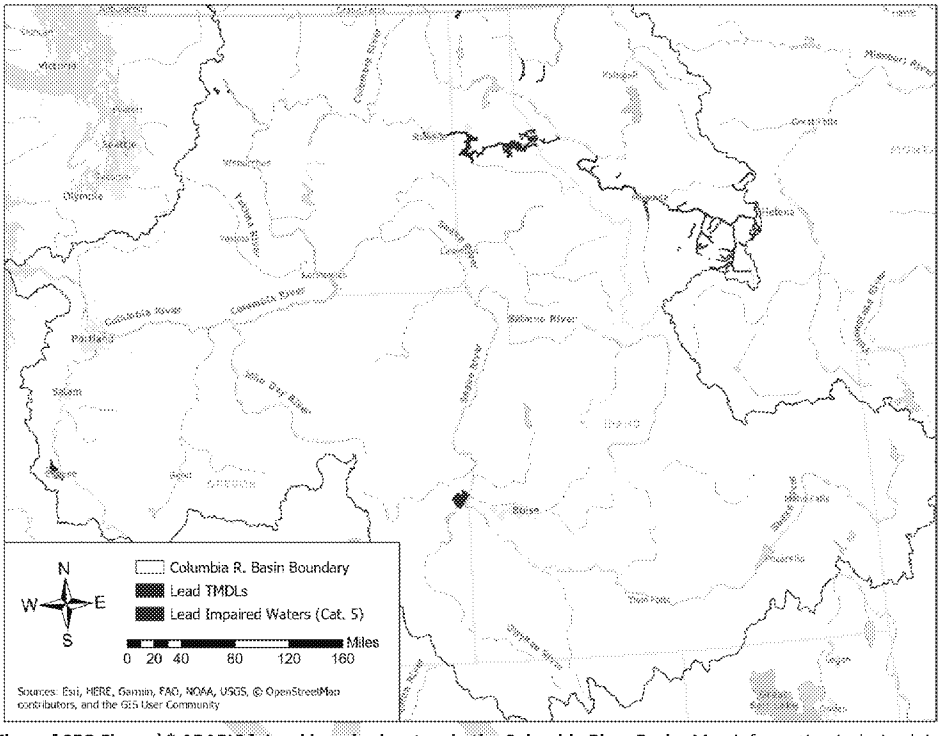

Figure [SEQ Figure * ARABIC]. Lead impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Mining or industrial activities are the primary causes of lead impairments. Idaho has the greatest number of impairments identified without an approved TMDL in the Columbia River basin. The Coeur d'Alene River, Upper Spokane River and Lower Kootenai River watersheds contain at least one waterbody listed as impaired by lead. The East Fork of Eagle Creek in the Upper Coeur d'Alene River watershed has a lead TMDL. In Oregon, lead impairments without an approved TMDL occur in the Owyhee and Willamette River watersheds; the Columbia Slough has a lead TMDL. The Lake Chelan watershed is the only Washington basin with lead-impaired waters without an approved TMDL. A lead TMDL has been developed in the Spokane River watershed. There are no known lead impairments in Montana without a TMDL; there are nine lead TMDLs in the state.

Table [SEQ Table * ARABIC]. Watersheds with lead impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Coeur d'Alene River, Upper Spokane River and Lower Kootenai River watersheds	Upper Coeur d'Alene River

Montana	None	Bitterroot River, Blackfoot Headwaters, Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Kootenai – Fisher Project, Little Blackfoot River, Middle Blackfoot River, Ninemile, Prospect Creek, Rock Creek, and Upper Clark Fork River
Oregon	Owyhee and Willamette River watersheds	Columbia Slough
Washington	Lake Chelan watershed	Spokane River watershed

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Mercury

Mercury is a naturally occurring metal that cycles through various chemical and physical forms in the environment. Inorganic mercury can enter the water or soil from the weathering of rocks that contain inorganic mercury salts. The inorganic mercury ore found at mining sites is often composed of mercuric sulfide or cinnabar. Elemental mercury is a shiny liquid at room temperature that is used in older thermometers, fluorescent lightbulbs, batteries and other products. Bacteria can convert inorganic mercury in the aquatic environment into methylmercury, a form of the element that readily bioaccumulates in organisms and biomagnifies in the food chain – which can lead to elevated levels of mercury in the tissue of predator species, including birds, and resident fish caught for human consumption. Elemental and methylmercury causes neuro/developmental toxicity while inorganic mercury is associated with immune system effects. Elevated levels of methylmercury in fish tissues can lead to recommendations to restrict consumption of resident fish species (i.e. fish advisories). Mercury enters waterways through multiple sources, including atmospheric deposition (e.g. coal combustion), industrial (e.g. gold production) or wastewater discharges, mining activities, or stormwater runoff (U.S. EPA, 2019).

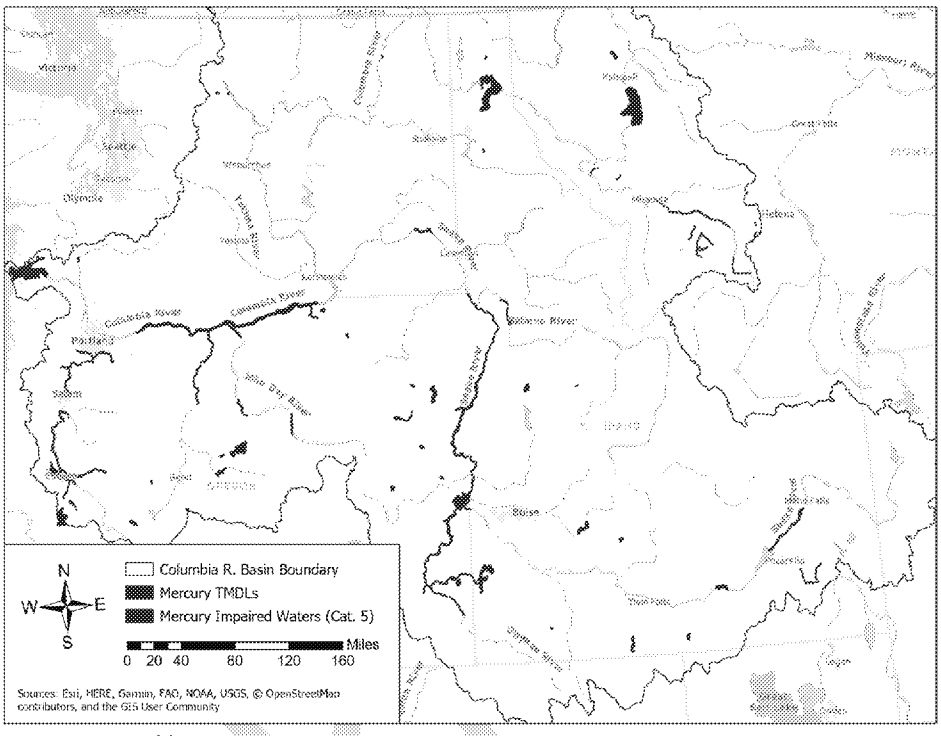

Figure [SEQ Figure * ARABIC]. Mercury impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Mercury is the only toxic contaminant that is the cause of Category 5 impaired waters in all four Columbia River Basin states. Mercury impairments are commonly found in watersheds with historic and/or active mining activities, and in basins with lakes with large surface areas that receive mercury through atmospheric deposition.

Methylmercury impairs significant lengths of the mainstem Columbia and Snake Rivers. A small section of Lake Roosevelt south of Kettle Falls, WA is listed as impaired for mercury. The lower mainstem Columbia River immediately upstream of McNary Dam down to Eagle Creek immediately above Bonneville Dam and the Columbia River estuary below Puget Island are impaired for methylmercury.

On the upper Snake River, mercury impairs the reach between Idaho Falls, ID and the upstream boundary of the American Falls Reservoir, as well as Walcott Lake, the impounded water behind Minidoka Dam. Farther downstream, methylmercury impairments cover the mainstem Snake River beginning where it crosses into Oregon east of Caldwell, ID, through Hells Canyon, Oxbow and Brownlee

Reservoirs, and downstream to the northeastern tip of Oregon's state boundary. The Snake River is also impaired for mercury from Lower Granite Dam to Penawawa Canyon, WA.

In Idaho, mercury impairs lakes and tributary river reaches in the Owyhee, Boise, Payette, Bruneau, Coeur d'Alene, Kootenai, Salmon, Goose, and Upper Snake River basins. Idaho developed a mercury TMDL that covers the Salmon Falls Creek Reservoir within the Upper Snake River watershed. In Montana's Flathead River watershed, Whitefish and Flathead Lakes are impaired for mercury. Major tributary basins in Oregon with mercury or methylmercury impairments include the Owyhee, Powder, John Day, and Deschutes River watersheds. Tributary watersheds with mercury impairments in Washington include the Pend Oreille River, Lake Chelan, and Cowlitz River.

Table [SEQ Table * ARABIC]. Watersheds with mercury impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Mainstem Snake River; Owyhee, Boise, Payette, Bruneau, Coeur d'Alene, Kootenai, Salmon, Goose, and Upper Snake River watersheds	Upper Snake River watershed
Montana	Flathead River watershed	Clark Fork – Drummond, Clark Fork – Silver Bow Creek, Flint Creek, Little Blackfoot, Ninemile, and Rock Creek
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Powder, John Day, and Deschutes River watersheds	Willamette River watershed
Washington	Mainstem Columbia and Snake Rivers; Lake Chelan, Pend Oreille, and Cowlitz River watersheds	None

Note: The Montana TMDLs are listed by the name of their respective planning areas.

Selenium

Selenium is a naturally occurring element found in sedimentary rocks, shales, coal and phosphate-containing soils. Selenium can be released into water naturally through the weathering of selenium-containing rocks, and by human activities such as surface mining, coal-fired power plants, and irrigated agriculture (U.S. Environmental Protection Agency, 2019). Selenium's toxicity to livestock is the major effect of concern.

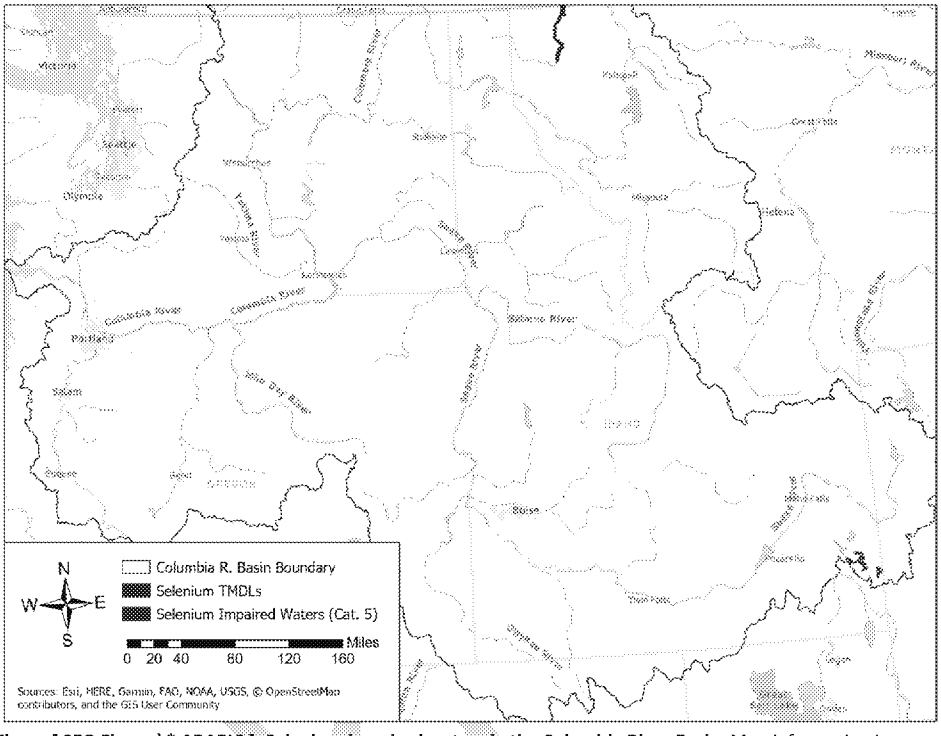

Figure [SEQ Figure * ARABIC]. Selenium impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Selenium impairments are found in regions with historic or active mining activities. Affected Idaho basins include the Blackfoot and Salt River watersheds. In Montana, Lake Koocanusa in the Upper Kootenai watershed is impaired for selenium.

Table [SEQ Table * ARABIC]. Watersheds with selenium-impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Blackfoot and Salt River watersheds	None
Montana	Upper Kootenai River watershed	Upper Clark Fork River watershed
Oregon	None	None
Washington	None	None

Note: The Montana TMDL is listed by the name of its planning area.

Pesticides

Aldrin/Dieldrin

Aldrin and Dieldrin are legacy organochlorine insecticides with similar chemical structures that were used in agriculture, timber preservation, and in rubber coverings of electrical and telecommunication cables (U.S. Environmental Protection Agency, 2003). EPA banned the chemicals in 1987. Aldrin degrades in the environment to form Dieldrin, and as a result, the pesticides are considered "linked" together for the purposes of this document (Agency for Toxic Substances and Disease Registry, 2011). Aldrin and Dieldrin cause human liver toxicity and are classed as probable carcinogens by EPA's IRIS program (U.S. EPA, 2017). Aldrin and/or Dieldrin impair waterbodies in basins with agricultural activities.

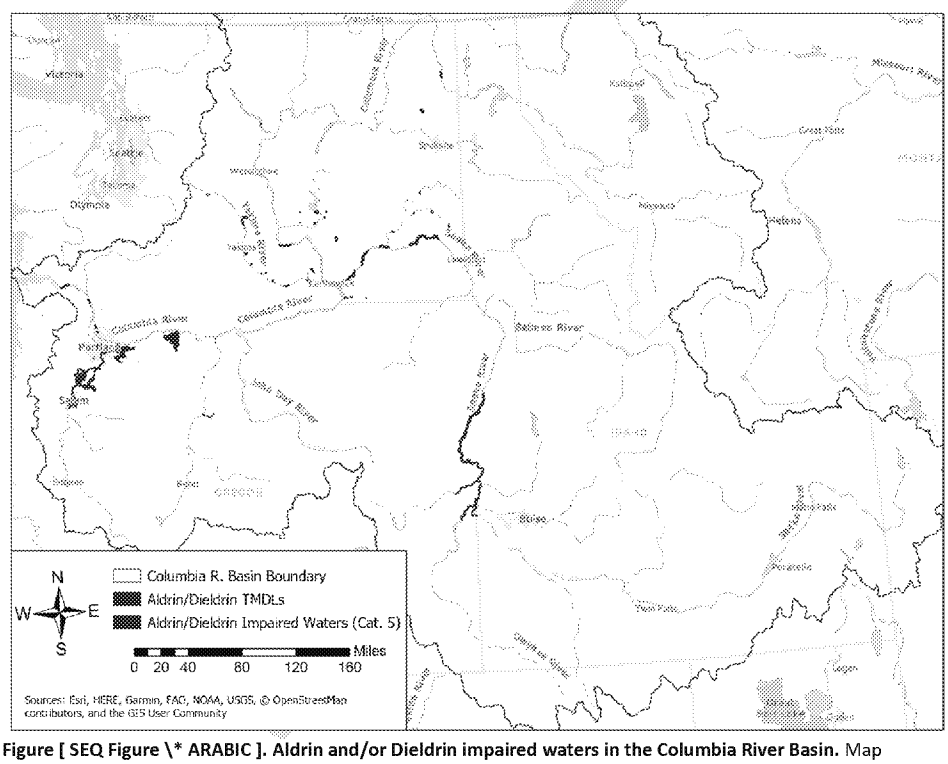

Figure [SEQ Figure * ARABIC]. Aldrin and/or Dieldrin impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Impairments on the mainstem Columbia River include the reach upstream of the Saddle Mountain National Wildlife Refuge and several reaches in the lower Columbia upstream and downstream of the Longview, WA. There is a TMDL covering Dieldrin within the Snake River – Hells Canyon reach.

Commented [GDE1]: 1)Update text with new information on Aldrin/Dieldrin TMDL extent.

Deleted text indicated category 5 waters – unable to locate in table.

In Washington, Aldrin and/or Dieldrin impair rivers in the following watersheds: Pend Oreille River, Colville River, Lake Chelan, Palouse River, Crab Creek, Upper Columbia-Priest Rapids, Yakima River, Lower Columbia-Clatskanie. In Oregon, the pesticide and/or its breakdown product impairs waters in the Owyhee, Malheur, Powder, Deschutes, Hood, Sandy, and Willamette River basins. No Aldrin or Dieldrin category 5 impairments have been identified in Idaho or Montana.

Table [SEQ Table * ARABIC]. Watersheds with Aldrin and/or Dieldrin impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	Snake River – Hells Canyon watershed
Montana	None	None
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Malheur, Powder, Deschutes, Hood, Sandy, and Willamette River watersheds	Columbia Slough and Willamette River watersheds
Washington	Mainstem Columbia and Snake Rivers; Upper Columbia-Priest Rapids, Lower Columbia-Clatskanie, Pend Oreille, Colville, Lake Chelan, Palouse, Crab Creek, Yakima River watersheds	Palouse, Walla Walla, and Yakima River watersheds

Commented [GDE2]: 2)WQ5 impairment for Aldrin/Dieldrin is obscured on map by TMDL layer for ID. Make note of this in text.

Commented [GDE3]: 3)OR Draft 2018/2020 Integrated Report data does not include a polygon with the extent of the lead TMDL in the Columbia Slough.
4)

Chlorpyrifos

Chlorpyrifos is a current-use organophosphate insecticide used since 1965 to control a variety of pests, including mites and ticks. The chemical is applied to agricultural crops including fruit and nut trees, Brussel sprouts, broccoli, cauliflower, and other row crops. Additionally, the insecticide is applied for non-agricultural purposes including on golf courses, turf, and found in non-structural wood treatments such as utility poles or fence posts. Chlorpyrifos is also registered as a mosquito adulticide and for use in roach and ant bait stations (U.S. Environmental Protection Agency, 2019). The pesticide affects the nervous system of insects by inhibiting acetylcholinesterase, a key enzyme associated with regulating nerve impulses. Chlorpyrifos may also affect human nervous system function (ATSDR, 1997). Regulatory restrictions, including a statewide ban in California beginning in 2021 and an expected ban of the chemical in the European Union, are projected to reduce demand for the pesticide. The world's largest producer of Chlorpyrifos, Corteva, announced in February 2020 the company would no longer produce the chemical by the end of the year, citing declining sales (Polansek, 2020).

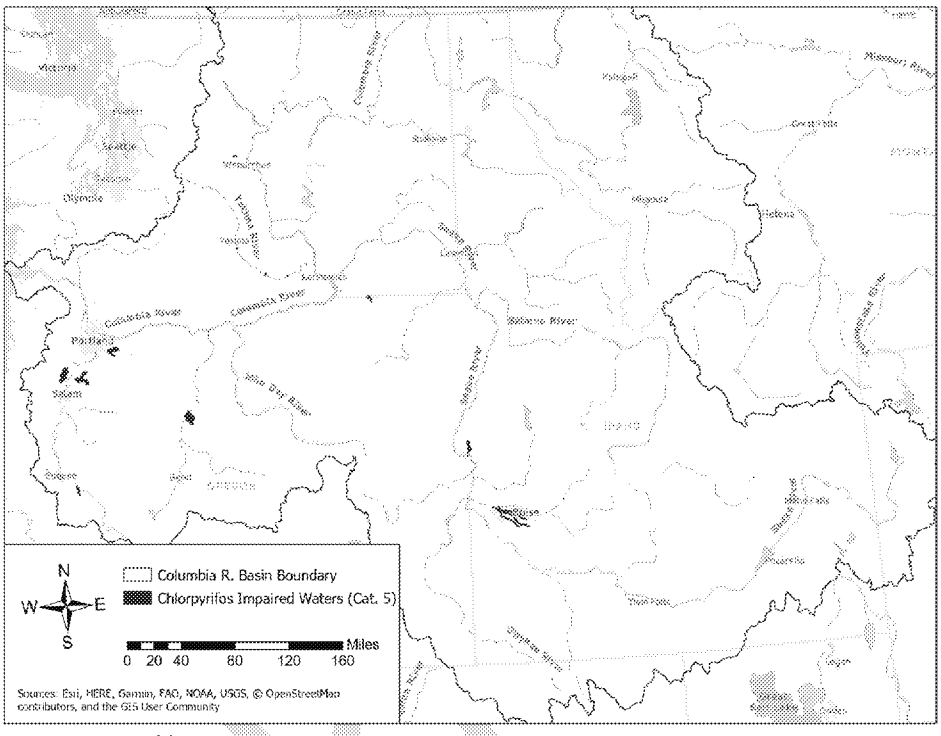

Figure [SEQ Figure * ARABIC]. Chlorpyrifos impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

Chlorpyrifos impairments are have been identified in agricultural basins and near urban centers. In Idaho, elevated concentrations of Chlorpyrifos impair designated uses on tributaries in the Lower Boise River watershed and in a tributary to Brownlee Reservoir. The State of Oregon has listed chlorpyrifos-impaired streams in the Umatilla, Deschutes, and Willamette River basins. In Washington State, Chlorpyrifos impairments affect the Wenatchee and Yakima River basins. There are no identified impairments in the state of Montana.

Table [SEQ Table * ARABIC]. Watersheds with Chlorpyrifos impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	Lower Boise River and Brownlee Reservoir watersheds	None
Montana	None	None
Oregon	Umatilla, Deschutes, and Willamette River watersheds	None
Washington	Wenatchee and Yakima River watersheds	None

Dichlorodiphenyltrichloroethane (DDT)

DDT is an organochlorine compound that was widely used to address insect-borne diseases and to control agricultural and household pests beginning in the 1940s. The chemical persists in the environment and accumulates in fatty tissues. The compound causes predatory birds to lay eggs with thinner shells, decreasing the viability of their offspring. In the soil DDT breaks down into metabolites including dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyldichloroethane (DDD). In 1972, EPA banned the chemical for use in the U.S. due to its adverse impacts to wildlife and potential human health risks (U.S. EPA, 2019). EPA's IRIS program classifies DDT as having liver toxicity and as a carcinogen and classifies DDT's metabolites, DDE and DDD, as carcinogens (U.S. EPA, 2017). The following overview of 303(d) listings in the Basin does not differentiate between DDT and its breakdown products – hereafter "DDT" refers to all three compounds. DDT impairs surface waterbodies in basins with significant historic agricultural activities in Oregon and Washington.

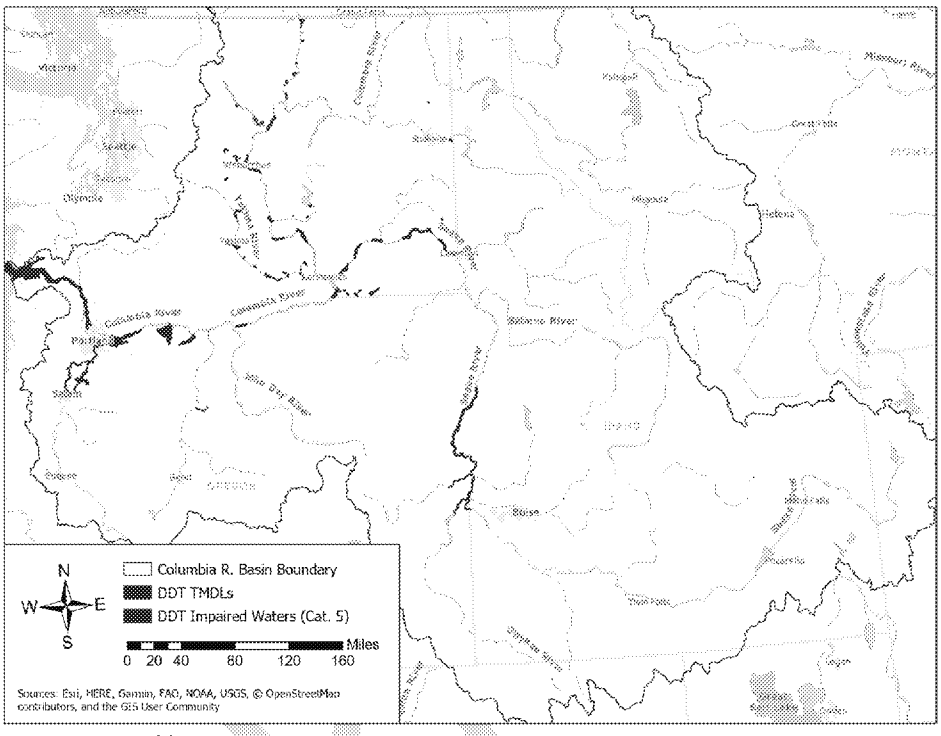

Figure [SEQ Figure * ARABIC]. DDT impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

The mainstem Columbia and Snake Rivers have multiple reaches impaired by DDT. Impairments on the Columbia cover: small portions of Lake Roosevelt and Lake Entiat, reaches above and below the City of Wenatchee, WA, the reach upstream of the mouth of Crab Creek, reaches bracketing the Saddle Mountain National Wildlife Refuge, and portions of Lake Wallula and Lake Umatilla. In addition, the lower Columbia River is impaired for DDT from Bonneville Dam to the mouth of the estuary – excluding the reach between the Sandy and Willamette Rivers. Portions of the Snake River impaired by the legacy pesticide include the reach in eastern Oregon from the border of Idaho to the Boise River confluence, Oxbow Reservoir, and the majority of the mainstem below Lewiston, ID. There is a TMDL covering DDT impairments within the Hells Canyon complex.

Oregon watersheds with DDT impairments include the Owyhee, Malheur, Deschutes, Hood, and Willamette River basins. In Washington, DDT impairs waters in the following tributary basins: Crab Creek, Colville River, Okanogan River, Spokane River, Rock Creek, Walla Walla River, Yakima River,

Wenatchee River, Lake Chelan watershed, and the Upper Columbia-Priest Rapids and -Entiat watersheds. There are no identified category 5 DDT impairments in Idaho or Montana.

Table [SEQ Table * ARABIC]. Watersheds with DDT impaired waters.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	Snake River – Hells Canyon watershed
Montana	None	None
Oregon	Mainstem Columbia and Snake Rivers; Owyhee, Malheur, Deschutes, Hood, and Willamette River watersheds	Columbia Slough and Willamette River watersheds
Washington	Mainstem Columbia and Snake Rivers; Crab Creek, Lake Chelan, Upper Columbia-Priest Rapids and -Entiat, Colville, Okanogan, Spokane, Rock Creek, Walla Walla, Yakima, and Wenatchee River watersheds	Lake Chelan, Lower Okanogan, Walla Walla River, Wenatchee River, Yakima River watersheds

Persistent Organic Pollutants

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of over 100 different chemicals that are formed during combustion processes, in particular the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat (NPCC and Columbia River Toxics Reduction Working Group, 2018). Some PAHs are manufactured. Most PAHs do not dissolve easily in water and bind to solid particles that settle to the bottom of rivers and lakes. Major sources of PAHs in the air include volcanic eruptions, motor vehicle exhaust, wood smoke, and municipal trash incineration facilities (Agency for Toxic Substances and Disease Registry, 1996). In 2018, the Northwest Power and Conservation Council and Columbia River Toxics Reduction Working Group developed a StoryMap of available PAH data in water and soil sediment in the Basin. The map can be accessed on the Northwest Power and Conservation Council's [HYPERLINK "https://www.nwcouncil.org/news/mapping-toxics"]. The major PAH toxic effect of concern is that certain PAHs are carcinogenic to humans (i.e. carcinogenic PAHs or cPAHs). EPA's IRIS program has recently updated the toxicity information for a key cPAH, benzo[a]pyrene (U.S. EPA, 2017).

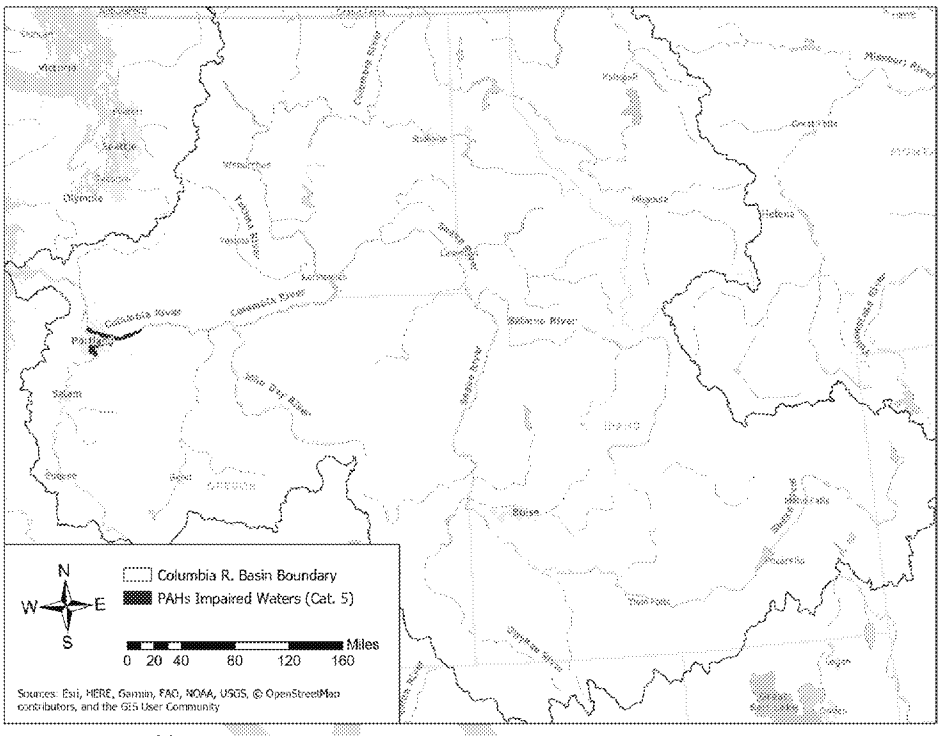

Figure [SEQ Figure * ARABIC]. PAHs impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

The mainstem Columbia River from McCord Creek to the mouth of the Willamette River is impaired for PAHs. In addition, waters in the Willamette River Basin are impaired for the following specific PAH compounds: Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene 3,4, and Benzo(k)fluoranthene.

Table [SEQ Table * ARABIC]. Watersheds with waters impaired by PAHs.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	None
Montana	None	None
Oregon	Mainstem Columbia River; Willamette River watershed	None
Washington	None	None

Polychlorinated Biphenyls (PCBs)

PCBs are a group of man-made organic chemicals consisting of carbon, hydrogen and chlorine atoms. PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until manufacturing was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. PCBs do not readily break down in the environment and can remain for long periods cycling between the air, water and soil. The chemicals can be carried long distances and have been found in snow and seawater in areas far from where they were released into the environment. PCBs may be present in products and materials produced before the 1979 PCB ban including in transformers and other electrical equipment, oil, fluorescent lights, and other products (U.S. EPA, 2019). EPA's IRIS program classifies PCB mixtures as human carcinogens (U.S. EPA, 2017). Aroclor 1254, an industrial mixture of PCBs previously used in the U.S. adversely affects the human immune system (U.S. EPA, 2017).

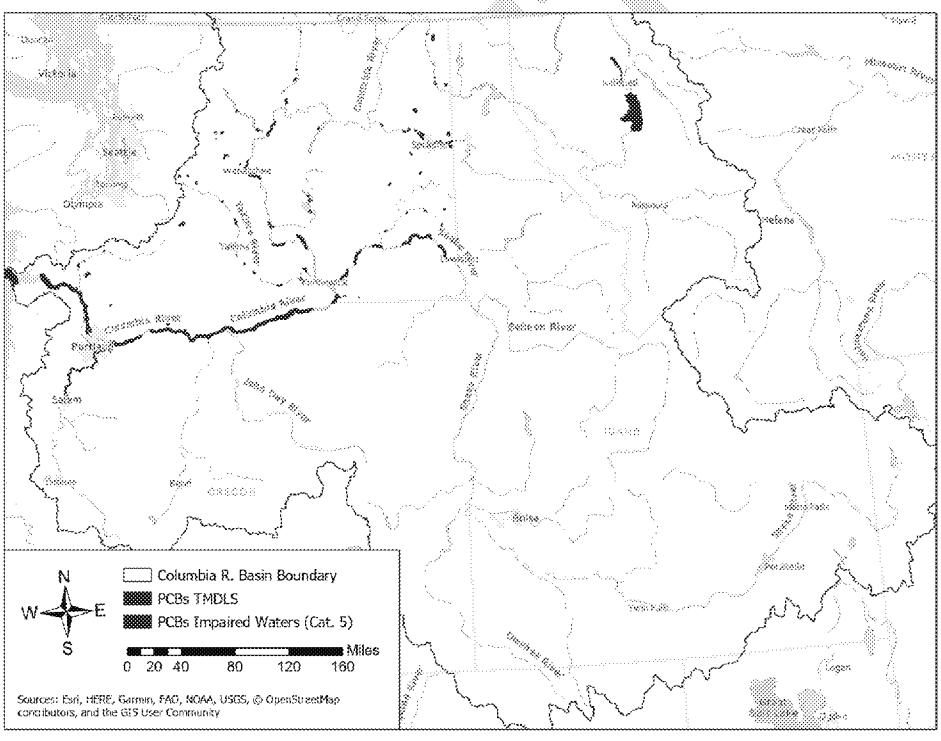

Figure [SEQ Figure * ARABIC]. PCBs impaired waters in the Columbia River Basin. Map information is derived, in part, from draft 303(d) list data and is believed to be accurate, but accuracy is not guaranteed. The map is not authoritative and should be used for informational/reference purposes only. The map is not to be used for legal purposes. To improve their visibility, the sizes of impaired waterbody segments have been slightly exaggerated and are not to scale.

PCBs impair the following segments on the mainstem Columbia River: portions of Lake Roosevelt and Lake Entiat; reaches above and below the City of Wenatchee, WA; the reach upstream of the mouth of Crab Creek; reaches bracketing the Saddle Mountain National Wildlife Refuge; portions of Lake Wallula and Lake Umatilla; and portions of the estuary above and below Longview, WA.

In Oregon, PCBs impair the Willamette River watershed. The following Washington watersheds have waters impaired by PCBs: Pend Oreille River, Colville River, Spokane River, Rock Creek, Palouse River, Crab Creek, Upper Columbia-Entiat, Banks Lake, Okanogan River, Lake Chelan, Wenatchee River, Yakima River, Cowlitz River, Lower Columbia-Clatskanie. In Montana's Flathead River watershed, Whitefish Lake, Whitefish River, and Flathead Lake are impaired by PCBs.

Table [SEQ Table * ARABIC]. Watersheds with waters impaired by PCBs.

State	Location of impaired waters without a TMDL (Category 5)	Location of EPA-approved TMDLs (Category 4a)
Idaho	None	None
Montana	Flathead River	None
Oregon	Mainstem Columbia River; Willamette River	Columbia Slough
Washington	Mainstem Columbia River; Pend Oreille River, Colville River, Spokane River, Rock Creek, Palouse River, Crab Creek, Upper Columbia-Entiat, Banks Lake, Okanogan River, Lake Chelan, Wenatchee River, Yakima River, Cowlitz River, Lower Columbia-Clatskanie watersheds	Lake Chelan, Lower Okanogan River, Palouse River, Walla Walla River watersheds

Total Maximum Daily Loads for Toxic Contaminants

The States of Idaho, Montana, Oregon, and Washington have developed TMDLs that set forth the maximum amount of a pollutant allowed in a waterbody for toxic contaminants in the Columbia River Basin. For more information on TMDLs, refer to EPA's [HYPERLINK "https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls"][4]. The following list includes all toxics-related TMDLs within the Basin.

Idaho

Lower Clark Fork River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Lower Clark Fork River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	2007
Copper	
Zinc	

[4] URL: [HYPERLINK "https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls"]

For specific information on the location and extent of toxics-impairments, refer to the [HYPERLINK "https://www.deq.idaho.gov/media/453494-_water_data_reports_surface_water_tmdls_clark_fork_lower_clark_fork_lower_entire.pdf"][5].

Portneuf River Watershed:
In 2001, EPA approved a TMDL for oil and grease in the Portneuf River watershed. For specific information on the location and extent of the impairment(s), refer to the [HYPERLINK "https://www.deq.idaho.gov/media/464480-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_entire.pdf"][6]. In 2010, EPA approved a revision to the original TMDL. Refer to the updated TMDL document, the [HYPERLINK "https://www.deq.idaho.gov/media/464542-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_revision_addendum_final.pdf"][7], for updated information and context related to the oil and grease impairment.

Snake River – Hells Canyon Watershed:
Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Snake River – Hells Canyon watershed

Toxic Contaminant	Date of EPA-Approved TMDL
DDD	2004
DDE	
DDT	
Dieldrin	

For specific information on the location and extent of toxics-impairments, refer to the [HYPERLINK "https://www.deq.idaho.gov/media/454498-snake_river_hells_canyon_entire.pdf"][8].

Upper Coeur d'Alene River Watershed:
Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Upper Coeur d'Alene River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	2002
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://www.deq.idaho.gov/media/453947-_water_data_reports_surface_water_tmdls_cda_river_nf_cda_river_nf_entire.pdf"][9].

[5] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/453494-_water_data_reports_surface_water_tmdls_clark_fork_lower_clark_fork_lower_entire.pdf"]
[6] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/464480-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_entire.pdf"]
[7] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/464542-_water_data_reports_surface_water_tmdls_portneuf_river_portneuf_river_revision_addendum_final.pdf"]
[8] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/454498-snake_river_hells_canyon_entire.pdf"]
[9] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/453947-_water_data_reports_surface_water_tmdls_cda_river_nf_cda_river_nf_entire.pdf"]

Upper Snake River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Upper Snake River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Mercury	2002

For specific information on the location and extent of the mercury impairment, refer to the [HYPERLINK "https://www.deq.idaho.gov/media/463815-salmon_falls_creek_entire.pdf"][10].

Montana

Bitterroot River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Bitterroot River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014
Lead	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-04a.pdf"][11]. [HYPERLINK "http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf"]

Blackfoot Headwaters TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Blackfoot Headwaters planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2003
Cadmium	
Copper	
Iron	
Lead	
Manganese	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-01a.pdf"][12].

Clark Fork – Drummond Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Clark Fork — Drummond planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2013
Antimony	
Arsenic	
Cadmium	

[10] Document URL: [HYPERLINK "https://www.deq.idaho.gov/media/463815-salmon_falls_creek_entire.pdf"]
[11] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-04a.pdf"]
[12] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-01a.pdf"]

Copper	
Iron	
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-03a.pdf"][13] document.

Clark Fork River & Silver Bow Creek Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Clark Fork and Silver Bow Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2014
Cadmium	
Copper	
Iron	
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf"][14].

Flint Creek Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Flint Creek watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Antimony	2012, 2015*
Arsenic	2012
Cadmium	
Copper	
Iron	
Lead	
Mercury	
Zinc	

* In 2015, the Antimony TMDL was developed for Douglas Creek after the metal-impairment was added to the state's 2014 303(d) list based on new data collected between 2007-2011.

[13] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-03a.pdf"]

[14] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf"]

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a.pdf"][15] and its [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a-a.pdf"][16].

Kootenai – Fisher Project Area TMDLs:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Kootenai – Fisher Project Area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2014
Cadmium	
Copper	
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/K01-TMDL-04a.pdf"][17].

Little Blackfoot River TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Little Blackfoot planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014*
Arsenic	2011
Beryllium	
Cadmium	
Copper	
Cyanide	
Iron	
Lead	
Mercury	
Zinc	2011, 2014*

* In 2013, Montana DEQ reassessed streams in the Little Blackfoot River TMDL planning area and, based on new data, developed TMDLs for 9 Aluminum impairments and 1 Zinc impairment.

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a.pdf"][18] and its [HYPERLINK "https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a-a.pdf"][19].

Middle Blackfoot-Nevada Creek Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Middle Blackfoot-Nevada Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2008

[15] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a.pdf"]
[16] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-01a-a.pdf"]
[17] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/K01-TMDL-04a.pdf"]
[18] Document URL: [HYPERLINK "https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a.pdf"]
[19] Document URL: [HYPERLINK "https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-03a-a.pdf"]

Arsenic	2008, 2014*
Copper	2008
Iron	2008, 2014*
Lead	2008

* High levels of uncertainty due to incomplete assessments and insufficient datasets caused Montana DEQ to not address multiple impairments in the original 2008 TMDL; one new impairment was identified after the document's publication. In 2014, Montana DEQ developed an Addendum to the 2008 TMDL.

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a.pdf"][20] and its [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a-a.pdf"][21].

Ninemile TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Ninemile planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Copper	2005
Lead	
Mercury	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C04-TMDL-01a.pdf"][22] document.

Prospect Creek TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Prospect Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Antimony	2006
Arsenic	
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-02a.pdf"][23] document.

Rock Creek TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Rock Creek planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2013

[20] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a.pdf"]
[21] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a-a.pdf"]
[22] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C04-TMDL-01a.pdf"]
[23] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-02a.pdf"]

Arsenic	
Copper	
Iron	
Lead	
Mercury	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-02a.pdf"][24].

Thompson Project TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Thompson Project planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Aluminum	2014
Cadmium	
Copper	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-04a.pdf"][25].

Upper Clark Fork River TMDL Planning Area:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Upper Clark Fork planning area.

Toxic Contaminant	Date of EPA-Approved TMDL
Arsenic	2010
Cadmium	
Copper	
Cyanide	
Iron	
Lead	
Selenium	
Sulfate	2014
Zinc	2010

For specific information on the location and extent of the toxics-related impairments, refer to [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a.pdf"][26] and its [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a-a.pdf"][27].

Oregon

Columbia Slough Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Columbia Slough watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
2,3,7,8 TCDD (Dioxin)	1998

[24] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C02-TMDL-02a.pdf"]
[25] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C13-TMDL-04a.pdf"]
[26] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a.pdf"]
[27] Document URL: [HYPERLINK "http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C01-TMDL-02a-a.pdf"]

DDE/DDT	
Dieldrin	
Lead	
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://www.oregon.gov/deq/FilterDocs/columbiasloughtmdl.pdf"][28]

Willamette River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Willamette River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Chlordane	2008
Dieldrin	
DDT	
Iron	
Mercury	2006, 2019

For specific information on the location and extent of the toxics-related impairments developed in 2008, refer to the [HYPERLINK "https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx"][29].

In 2006, Oregon developed a TMDL to cover widespread mercury impairments in the Willamette River watershed. In 2017, following a lawsuit, the U.S. District Court required EPA to revise the mercury TMDL. In November 2019, Oregon Department of Environmental Quality submitted the Revised Willamette Basin Mercury TMDL, which EPA disapproved. Under the Clean Water Act, when EPA disapproves a TMDL EPA must issue a new TMDL within 30 days. At the end of 2019, EPA released the TMDL; the public comment period closed on February 4th, 2020. As of February 2020, EPA is considering the received comments and may update the document. Until a final TMDL is released by EPA, the 2006 Willamette Mercury TMDL remains in effect. For specific information on the location and extent of mercury impairments in the Willamette River watershed, refer to [HYPERLINK "https://www.epa.gov/sites/production/files/2019-12/documents/tmdl-willamette-mercury-12-30-2019.pdf"].

Washington

Lake Chelan Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Lake Chelan watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDT	2006
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0610022.pdf"][30].

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[28] Document URL: [HYPERLINK "https://www.oregon.gov/deq/FilterDocs/columbiasloughtmdl.pdf"]

[29] Document available for download at the following URL: [HYPERLINK "https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx"]

[30] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0610022.pdf"]

Lower Okanogan River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Lower Okanogan River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDT	2004
DDE	
DDD	
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0410043.pdf"][31].

Similkameen River Watershed:

In 2004, Washington Ecology developed a TMDL for arsenic in the Similkameen River. For specific information on the location and extent of impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0310074.pdf"][32].

Palouse River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Palouse River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Dieldrin	2007
PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0703018.pdf"][33].

Spokane River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Spokane River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
Cadmium	1999
Lead	
Zinc	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/9949.pdf"][34].

Walla Walla River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Walla Walla River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL

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[31] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0410043.pdf"]

[32] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0310074.pdf"]

[33] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0703018.pdf"]

[34] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/9949.pdf"]

DDT	2006
DDE	
DDD	
t-DDT	
Chlordane	
Dieldrin	
Hexachlorobenzene	
Heptachlor Epoxide	
Toxaphene	
Total PCBs	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0510079.pdf"][35].

Wenatchee River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Wenatchee River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDT	2007
DDE	
DDD	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0710046.pdf"][36].

Yakima River Watershed:

Table [SEQ Table * ARABIC]. Toxic pollutants with approved TMDLs in the Yakima River watershed.

Toxic Contaminant	Date of EPA-Approved TMDL
DDT	2002
DDE	
Dieldrin	

For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/9810202.pdf"][37] and the [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0210047.pdf"][38].

Columbia River Basin TMDLs

In 1991, the U.S. EPA developed a TMDL for Dioxin for the entire Columbia River Basin. For specific information on the location and extent of the toxics-related impairments, refer to the [HYPERLINK "https://nepis.epa.gov/Exe/ZyPDF.cgi/9100YR95.PDF?Dockey=9100YR95.PDF"][39].

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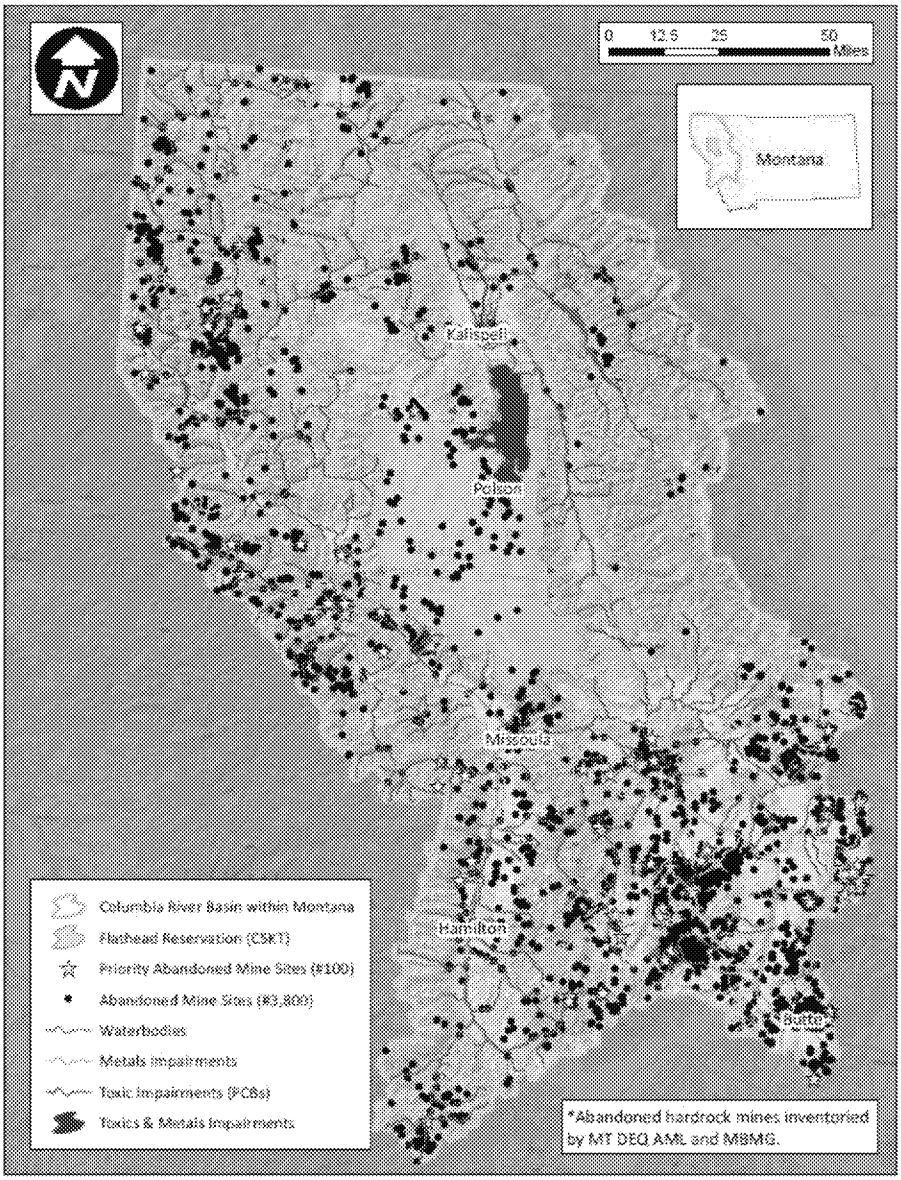
[35] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0510079.pdf"]
[36] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0710046.pdf"]
[37] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/9810202.pdf"]
[38] Document URL: [HYPERLINK "https://fortress.wa.gov/ecy/publications/documents/0210047.pdf"]
[39] Document URL: [HYPERLINK "https://nepis.epa.gov/Exe/ZyPDF.cgi/9100YR95.PDF?Dockey=9100YR95.PDF"]

Appendix A. Category 5 Toxics-Impaired Waters in Western Montana

Figure [SEQ Figure * ARABIC]. Toxics-impaired category 5 waters and abandoned mines in western Montana.



Source: U.S. EPA Region 8

Works Cited

[BIBLIOGRAPHY]